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APPLICATION NO.	FILING DATE	FIRST NAMED INVENTOR	ATTORNEY DOCKET NO.	CONFIRMATION NO.
10/829,105	04/21/2004	Douglas Leith	FRO-001.01	6483

25181 7590 10/03/2007

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EXAMINER	
SHIVERS, ASHLEY L	

ART UNIT	PAPER NUMBER
2609	

MAIL DATE	DELIVERY MODE
10/03/2007	PAPER

Please find below and/or attached an Office communication concerning this application or proceeding.

The time period for reply, if any, is set in the attached communication.

Office Action Summary	Application No.	Applicant(s)
	10/829,105	LEITH ET AL.
	Examiner	Art Unit
	Ashley L. Shivers	2609

-- The MAILING DATE of this communication appears on the cover sheet with the correspondence address --

Period for Reply

A SHORTENED STATUTORY PERIOD FOR REPLY IS SET TO EXPIRE 3 MONTH(S) OR THIRTY (30) DAYS, WHICHEVER IS LONGER, FROM THE MAILING DATE OF THIS COMMUNICATION.

- Extensions of time may be available under the provisions of 37 CFR 1.136(a). In no event, however, may a reply be timely filed after SIX (6) MONTHS from the mailing date of this communication.
- If NO period for reply is specified above, the maximum statutory period will apply and will expire SIX (6) MONTHS from the mailing date of this communication.
- Failure to reply within the set or extended period for reply will, by statute, cause the application to become ABANDONED (35 U.S.C. § 133). Any reply received by the Office later than three months after the mailing date of this communication, even if timely filed, may reduce any earned patent term adjustment. See 37 CFR 1.704(b).

Status

1)☐ Responsive to communication(s) filed on ____.

2a)☐ This action is **FINAL**. 2b)☒ This action is non-final.

3)☐ Since this application is in condition for allowance except for formal matters, prosecution as to the merits is closed in accordance with the practice under *Ex parte Quayle*, 1935 C.D. 11, 453 O.G. 213.

Disposition of Claims

4)☒ Claim(s) 1-43 is/are pending in the application.

4a) Of the above claim(s) ____ is/are withdrawn from consideration.

5)☐ Claim(s) ____ is/are allowed.

6)☒ Claim(s) 1-43 is/are rejected.

7)☐ Claim(s) ____ is/are objected to.

8)☐ Claim(s) ____ are subject to restriction and/or election requirement.

Application Papers

9)☒ The specification is objected to by the Examiner.

10)☒ The drawing(s) filed on 21 April 2004 is/are: a)☒ accepted or b)☐ objected to by the Examiner.

Applicant may not request that any objection to the drawing(s) be held in abeyance. See 37 CFR 1.85(a).

Replacement drawing sheet(s) including the correction is required if the drawing(s) is objected to. See 37 CFR 1.121(d).

11)☐ The oath or declaration is objected to by the Examiner. Note the attached Office Action or form PTO-152.

Priority under 35 U.S.C. § 119

12)☐ Acknowledgment is made of a claim for foreign priority under 35 U.S.C. § 119(a)-(d) or (f).

a)☐ All b)☐ Some * c)☐ None of:

1.☐ Certified copies of the priority documents have been received.

2.☐ Certified copies of the priority documents have been received in Application No. ____.

3.☐ Copies of the certified copies of the priority documents have been received in this National Stage application from the International Bureau (PCT Rule 17.2(a)).

* See the attached detailed Office action for a list of the certified copies not received.

Attachment(s)

1) ☒ Notice of References Cited (PTO-892)

2) ☐ Notice of Draftsperson's Patent Drawing Review (PTO-948)

3) ☒ Information Disclosure Statement(s) (PTO/SB/08) Paper No(s)/Mail Date 5/25/2004.

4) ☐ Interview Summary (PTO-413) Paper No(s)/Mail Date. ____ .

5) ☐ Notice of Informal Patent Application

6) ☐ Other: ____.

DETAILED ACTION

Specification

1. The disclosure is objected to because of the following informalities:

-- [0005] line 5 "decentralised" should be changed to "decentralized".

-- [0006] line 9 "increases" should be changed to "increase".

-- [0010] line 12 "behaviours" should be changed to "behaviors".

-- [0014] line 3 "increases" should be changed to "increase".

-- [0036] line 3 "behaviour" should be changed to "behavior".

-- [0044] line 2 "focussing" should be changed to "focusing".

-- [0051] line 5 "utilisation" should be changed to "utilization".

Appropriate correction is required.

Claim Objections

2. Claim 34 is objected to because of the following informalities:

-- the second period at the end of the claim should be deleted.

Appropriate correction is required.

Claim Rejections - 35 USC § 101

3. 35 U.S.C. 101 reads as follows:

> Whoever invents or discovers any new and useful process, machine, manufacture, or composition of matter, or any new and useful improvement thereof, may obtain a patent therefor, subject to the conditions and requirements of this title.

Claims 1-43 are rejected under 35 U.S.C. 101 because the claimed invention is directed to non-statutory subject matter. In the claims a method/networking component, respectively are being recited; however the independent claims, as well as the dependent claims, do not produce a tangible result because the values of the increase and decrease parameters constantly change as the values of the input change.

Claim Rejections - 35 USC § 112

4. The following is a quotation of the second paragraph of 35 U.S.C. 112:

> The specification shall conclude with one or more claims particularly pointing out and distinctly claiming the subject matter which the applicant regards as his invention.

5. Claims 1-43 provide for the use of congestion control, but, since the claims do not set forth any steps involved in the method/process, it is unclear what method/process applicant is intending to encompass. A claim is indefinite where it merely recites a use without any active, positive steps delimiting how this use is actually practiced.

Claims 1-43 are rejected under 35 U.S.C. 101 because the claimed recitation of a use, without setting forth any steps involved in the process, results in an improper definition of a process, i.e., results in a claim which is not a proper process claim under 35 U.S.C. 101. See for example *Ex parte Dunki*, 153 USPQ 678 (Bd.App. 1967) and *Clinical Products, Ltd.* v. *Brenner*, 255 F. Supp. 131, 149 USPQ 475 (D.D.C. 1966).

Claims 21, 31 and 43 are rejected under 35 U.S.C. 112, second paragraph, as being indefinite for failing to particularly point out and distinctly claim the subject matter which applicant regards as the invention. The applicants state in claims 21 and 43 executable computer code but do not provide the computer readable medium to implement the executable code. The applicants state that claim 31 depends on claim 30, which depends on claim 22. Both claims 22 and 30 are about the method of congestion control but claim 31 is about the method of transmitting data.

Claim Rejections - 35 USC § 103

6. The following is a quotation of 35 U.S.C. 103(a) which forms the basis for all obviousness rejections set forth in this Office action:

> (a) A patent may not be obtained though the invention is not identically disclosed or described as set forth in section 102 of this title, if the differences between the subject matter sought to be patented and the prior art are such that the subject matter as a whole would have been obvious at the time the invention was made to a person having ordinary skill in the art to which said subject matter pertains. Patentability shall not be negatived by the manner in which the invention was made.

7. Claims 1-8, 10-19 and 21 are rejected under 35 U.S.C. 103(a) as being unpatentable over Sally Floyd, Mark Handley, and Jitendra Padhye's "**A Comparison of Equation-Based and AIMD Congestion Control**", hereinafter referred to as Floyd in view of M. Allman, V. Paxson, and W. Stevens' "**TCP Congestion Control**", hereinafter referred to as Allman.

Regarding claims 1 and 12, Floyd teaches a method of congestion control in transmission of data in packets over a network link using a transport layer protocol **(See Introduction p1 lines 1-2)** in claim 1, and therefore it is inherent to use the networking component in claim 12 for transmission of data in packets over a network link using a transport layer protocol, the networking component being operative to implement congestion control, wherein:

b) the value of $cwnd_i$ is varied according to an additive-increase multiplicative-decrease (AIMD) law having an increase parameter a_i **(See Introduction p3 lines 1-3)**, and

c) the value of a_i is increased during each congestion epoch **(See Section 3.1 The Deterministic AIMD Response Function p2 lines 1-5)**.

Floyd fails to teach of the congestion window value and packet parameters.

Allman teaches:

a) the number of unacknowledged packets in transit in the link is less than or equal to a congestion window value $cwnd_i$ **(See Section 3.1 Slow Start and Congestion Avoidance p1 lines 4-6)**;

Therefore it would have been obvious to one of ordinary skill in the art at the time of the invention, to modify the method of Floyd to include the number of unacknowledged packets in transit in the link being less than or equal to a congestion window value $cwnd_i$ taught by Allman in order to provide a sender limitation on the amount of data that can be transmitted into the network at a time.

Regarding claim 2, Floyd further teaches a method of congestion control according to claim 1 in which the value of a_i increases at a fixed time after the start of each congestion epoch (**See Section 3.1 The Deterministic AIMD Response Function p2 lines 1-5**).

Regarding claim 3, Floyd further teaches a method of congestion control according to claim 2 in which the fixed time is calculated as a fixed multiple of the round-trip time for a data packet to travel over the network link (**See Section 3.1 The Deterministic AIMD Response Function p2 lines 1-5**).

Regarding claim 4, Floyd further teaches a method of congestion control according to claim 1 in which the value of a_i increases at a plurality of fixed times after the start of each congestion epoch (**See Section 3.1 The Deterministic AIMD Response Function p2 lines 1-5**).

Regarding claim 5, Floyd further teaches a method of congestion control according to claim 4 in which each fixed time is calculated as a respective fixed multiple of the round-trip time for a data packet to travel over the network link (**See Section 3.1 The Deterministic AIMD Response Function p2 lines 1-5**).

Regarding claim 6, Floyd claims a method of congestion control according to claim 1 in which the value of a_i is unity at the start of each congestion epoch (**One of ordinary skill in the art at the time of the invention would know to make alpha equal to unity because that is a corresponds with standard TCP**).

Regarding claim 7, Floyd further teaches a method of congestion control according to claim 1 in which the value of a_i increases as a function of time from the start of a congestion epoch (**See Section 3.1 The Deterministic AIMD Response Function p2 lines 1-5**).

Regarding claim 8, Floyd further teaches a method of congestion control according to claim 7 in which a_i increases as a polynomial function of time from the start of a congestion epoch (**See Section 3.1 The Deterministic AIMD Response Function Equation (4)**).

Regarding claim 10, Floyd further teaches a method of transmitting data in packets over a network link in which network congestion is controlled by a method according to claim 1 **(See Section 1 Introduction p1 lines 1-5)**.

Regarding claim 11, Floyd further teaches a method according to claim 10 in which during each congestion epoch, at a time prior to increase in the value of a_i, the method implements the transport control protocol (TCP) having standard congestion control **(See Section 1 Introduction p1 lines 1-5)**.

Regarding claim 13, Floyd further teaches a networking component according to claim 12 in which the value of a_i is increased at a fixed time after the start of each congestion epoch **(See Section 3.1 The Deterministic AIMD Response Function p2 lines 1-5)**.

Regarding claim 14, Floyd further teaches a networking component according to claim 13 in which the fixed time is calculated as a fixed multiple of the round-trip time, being the interval between the networking component placing the packet on the network link and its receiving an acknowledgement of receipt of the packet **(See Section 3.1 The Deterministic AIMD Response Function p2 lines 1-5)**.

Regarding claim 15, Floyd further teaches a networking component according to claim 12 in which the value of a_i is increased at a plurality of fixed times after the start of each congestion epoch (**See Section 3.1 The Deterministic AIMD Response Function p2 lines 1-5**).

Regarding claim 16, Floyd further teaches a networking component according to claim 15 in which each fixed time is calculated as a respective fixed multiple of the round-trip being the interval between the networking component placing the packet on the network link and its receiving an acknowledgement of receipt of the packet (**See Section 3.1 The Deterministic AIMD Response Function p2 lines 1-5**).

Regarding claim 17, Floyd implies a networking component according to claim 12 in which the value of α_i is unity at the start of each congestion epoch (**implied that a_i is one because unity equals one and it is known that when counting one is generally the first value taken into consideration therefore it is obvious to equate a_i with unity**).

Regarding claim 18, Floyd further teaches a networking component according to claim 12 in which the value of α_i is increased as a function of time from the start of a congestion epoch (**See Section 3.1 The Deterministic AIMD Response Function p2 lines 1-5**).

Regarding claim 19, Floyd further teaches a networking component according to claim 18 in which α_i is increased as a polynomial function of time from the start of a congestion epoch (**See Section 3.1 The Deterministic AIMD Response Function Equation (4)**).

Regarding claim 21, Floyd further teaches the networking component of claim 12 implemented in executable computer code. (**One of ordinary skill in the art at the time the invention was made would have readily recognized that in order for data to be transmitted through a network it must correspond with executable computer code**).

8. Claims 22, 23, 26, 28, 29, 32, 33, 37, 39-41 and 43 are rejected under 35 U.S.C. 103(a) as being unpatentable over Floyd in view of Allman and in further view of Dang-Hai Hoang and Dietrich Reschke's "**TCP-friendly Exponential Congestion Control for Multimedia Communication**", hereinafter referred to as Hoang.

Regarding claims 22 and 32, Floyd teaches a method of congestion control and a networking component for transmission of data in packets over a network link using a transport layer protocol, wherein:

b) the value of $cwnd_i$ is varied according to an additive-increase multiplicative-decrease (AIMD) law having a multiplicative decrease parameter β_i (**See Introduction p3 lines 1-3**); and

Floyd fails to teach of the number of unacknowledged packets placed by the networking component in transit on the link being less than or equal to a congestion window value $cwnd_i$.

Allman teaches:

a) the number of unacknowledged packets in transit in the link is less than or equal to a congestion window value $cwnd_i$ **(See Section 3.1 Slow Start and Congestion Avoidance p1 lines 4-6)**;

Therefore it would have been obvious to one of ordinary skill in the art at the time of the invention, to modify the method of Floyd to include the number of unacknowledged packets in transit in the link being less than or equal to a congestion window value $cwnd_i$ taught by Allman in order to provide a sender limitation on the amount of data that can be transmitted into the network at a time.

Floyd also fails to teach of the value of β_i being set as a function of one or more characteristics of one or more data flows carried over the network link.

Hoang teaches of the value of β_i being set as a function of one or more characteristics of one or more data flows carried over the network link **(See Equation 10)**.

Therefore it would have been obvious to one of ordinary skill in the art at the time of the invention, to modify the method of Floyd to include β_i being set as a function of one or more characteristics of one or more data flows carried over the network link taught by Hoang in order to show that β_i determines the increase or decrease of the throughput.

Regarding claims 23 and 33, Floyd in view of Allman teaches the method of congestion control and networking component according to claims 22 and 32, respectively, but fails to teach of beta being set as a function of round-trip time.

Hoang teaches of a method of congestion control according to claim 22 and a networking component according to claim 32 in which the value of β_i is set as a function of the round-trip time of data traversing the link (**See pg. 1589 p2 lines 1-4 and Fig. 5**).

Therefore it would have been obvious to one of ordinary skill in the art at the time of the invention, to modify the method/networking component of Floyd in view of Allman to include beta being a function of round-trip time taught by Hoang in order to determine how much influence the decrease parameter will have on the throughput.

Regarding claims 26 and 37, Floyd in view of Allman teaches of a method of congestion control and a networking component according to claims 22 and 33, respectively, but fails to teach of the increase parameter being a varied function of the decrease parameter.

Hoang teaches a method of congestion control and a networking component according to claims 22 and 33, respectively, in which the additive-increase multiplicative-decrease law has an increase parameter a_i, and a_i is varied as a function of β_i **(See Equation 10)**.

Therefore it would have been obvious to one of ordinary skill in the art at the time of the invention, to modify the method and networking component of Floyd in view of Allman to include the additive increase being varied as a function of the multiplicative decrease parameter taught by Hoang in order to have TCP-friendliness.

Regarding claims 28 and 39, Floyd in view of Allman teaches the method of congestion control according to claims 22 and 33, respectively, but fails to teach of the round-trip times are monitored periodically and the value of beta is adjusted in accordance with the updated round-trip time.

Hoang teaches a method of congestion control and a networking component according to claims 22 and 33 in which the value of round-trip times of one or more data flows carried over the network link are monitored periodically during transmission of data and the value of β_i is adjusted in accordance with updated round-trip values thereby determined **(See pg. 1589 p2 lines 1-4 and Fig. 5)**.

Therefore it would have been obvious to one of ordinary skill in the art at the time of the invention, to modify the method/networking component of Floyd in view of Allman to include the round-trip time being monitored and the decrease parameter being adjusted in accordance with the changing round-trip time taught by Hoang in order to determine how much influence the decrease parameter will have on the throughput.

Regarding claim 29, Floyd further teaches a method of congestion control according to claim 22 in which the value of β_i is set as a function of the mean inter-packet time of data flowing in the link or of the mean throughput (**See Section 4 A Comparison of TCP and TCP(α,β) Congestion Control, for TCP-Compatible Congestion Control p3 lines 7-9 and Fig. 2**).

Regarding claim 40, Floyd in view of Allman teaches a networking component according to claim 39 but fails to teach of beta being a function of inter-packet time.

Hoang claims a networking component according to claim 39 that sets the value of β_i as a function of the mean inter-packet time of data flowing in the link (**Examiner interprets this to mean that since β_i is a function of RTT then it is also a function of mean inter-packet time**).

Therefore it would have been obvious to one of ordinary skill in the art at the time of the invention, to modify the networking component of Floyd in view of Allman to include beta being a function of the inter-packet time taught by Hoang in order to determine how the flow of data will be affected by beta.

Regarding claim 41, Floyd in view of Allman fails to teach of a networking component according to claim 40 that sets the value of beta as a function of the minimum inter-packet time.

Hoang claims a networking component according to claim 40 that sets the value of β_i is set as a function of the minimum of the mean inter-packet time ($IPT_{min,i}$), where the mean is taken over a round-trip time period, being the interval between the networking component placing a packet on the network link and its receiving an acknowledgement of receipt of the packet (**One of ordinary skill in the art at the time the invention was made would have readily recognized using the minimum mean inter-packet time in order to maximize throughput because using the minimum time would maximize the amount of data being transmitted**).

Regarding claim 43, Floyd further teaches the networking component of claim 33 implemented in executable computer code. (**One of ordinary skill in the art at the time the invention was made would have readily recognized that in order for data to be transmitted through a network it must correspond with executable computer code**).

Allowable Subject Matter

9. Claims 9, 20, 24-25, 27, 30, 31, 34-36, 38, and 42 would be allowable if rewritten to overcome the rejection(s) under 35 U.S.C. 112, 2nd paragraph, set forth in this Office action and to include all of the limitations of the base claim and any intervening claims. The above claims appear to be novel and inventive because prior art fails to show or teach the mathematical algorithms claimed.

Conclusion

10. Any response to this action should be **faxed** to (571)273-8300 or **mailed** to:

Commissioner of Patents,
P.O. Box 1450
Alexandria, VA 223103-1450

Hand delivered responses should be brought to:
Customer Service Window
Randolph Building
401 Dulany Street
Alexandria, VA 22314

11. Any inquiry concerning this communication or earlier communications from the examiner should be directed to Ashley L. Shivers whose telephone number is (571) 270-3523. The examiner can normally be reached on Monday-Thursday 8:30-7:00 EST.

If attempts to reach the examiner by telephone are unsuccessful, the examiner's supervisor, Benny Tieu can be reached on (571) 272-7490. The fax phone number for the organization where this application or proceeding is assigned is 571-273-8300.

Information regarding the status of an application may be obtained from the Patent Application Information Retrieval (PAIR) system. Status information for published applications may be obtained from either Private PAIR or Public PAIR. Status information for unpublished applications is available through Private PAIR only. For more information about the PAIR system, see http://pair-direct.uspto.gov. Should you have questions on access to the Private PAIR system, contact the Electronic Business Center (EBC) at 866-217-9197 (toll-free). If you would like assistance from a USPTO Customer Service Representative or access to the automated information system, call 800-786-9199 (IN USA OR CANADA) or 571-272-1000.

AS

Benny Q. Tieu

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